Fountain County Soil Report.

By C. H. Orahood.

Location: The Wabash river follows the boundary line of Fountain County on the north and west sides. Warren County lies across the river on the north. On the west, the Wabash separates Warren and Vermillion counties from Fountain. It lies north of Parke and west of Montgomery and Tippecanoe counties.

Area: If a line be drawn east from Fountain, a village on the Wabash river between Attica and Covington, to the county line and one south to the county line, it will form a rectangle with sides, 19 and 17 miles. On the north there would be a triangular body of land containing approximately 69 square miles. On the west there would be a strip of land along the River containing about 79 square miles. The county includes nearly 400 square miles. It has a maximum length of 28½ miles, and a maximum width of 18¼ miles.

The range in elevation so far as known is from 500 to 700 ft. The region about Hillsboro in the eastern part of the county, with an elevation of 728 ft., is the highest in the county. There are points in the southern part of the county, about Yeddo and Kingman, that reaches an elevation of 707 to 712 ft. The lowest portion of the county is in the south-west part, where the Wabash leaves the county and has an elevation of 500 ft.

Drainage: With the Wabash river flowing along the north and west sides of the county and the general slope to the west and south, the natural drainage for the most part is good.

In the northern part, Big Shawnee flows entirely across the county from east to west and with its tributary Little Shawnee, makes up the principal drainage system of that portion of the county.

Coal creek and its tributaries make up the drainage system of central Fountain. Its source is in Montgomery county. Its course for over half the distance is practically parallel to Shawnee. But at Ayelsworth it swings abruptly to the south and its channel sinks deeper into the earth. The tributary streams have cut the adjacent region into hills and valleys. From Stone Bluff to the county line the stream is relatively sluggish, the country a comparative plain, no hills encountered as the stream is approached.

At Veedersburg the East Fork of Coal creek enters the main stream and from here the stream assumes a southwesterly direction to its confluence with the Wabash, a short distance below the boundary line.

The East Fork has a deep channel for most of its course across the county and the eroded hills present some rough topography. This rough area does not extend to any great distance back from the main stream. Sandstone and shale are exposed profusely along this stream in the vicinity of Hillsboro.

Prairie creek, a tributary to Coal creek, and Wabash Mill creek, drain the southern portion of the county. The southeastern corner of the county is cut up by Sugar Mill creek and its tributaries.

Bear creek with its tributary Rattlesnake creek flow through a deep sandstone gorge at Fountain. Here is located a summer resort of no little distinction, called Portland Arch. The narrow sandstone divide that formerly separated the small tributary from Bear creek has been worn through and now the stream flows through an arch in the solid sandstone wall.

Soil Discussion.

Soil, is broken bits of rock, either very fine or relatively coarse, along with organic matter. The top soil, or that which is usually spoken of as "the soil", is the layer uppermost and varies in thickness from three to twelve or fifteen inches.

The subsoil is that portion of the soil between the top soil and bed rock. Soil is the product of the various agencies of weathering. Heating and cooling causes an unequal expansion and contraction of rock surfaces, breaking them into fragments. These fragments, in turn, are acted upon in the same manner and broken into smaller and smaller bits. The pores of rocks fill with water, the water freezes and expands, bursting the rock. Water in passing through the air, takes on carbon dioxide. Water so charged, dissolves certain rock substances. Caves and caverns are often formed in this manner. By solution, then, rocks are being worn away. Roots of trees and plants aid materially in breaking rock especially bed rock.

Glaciers moving over rock surfaces grind the rock to fragments and "rockflour". This material may be carried several miles and deposited in moraines or heaps, giving the region a billowy or rolling to hilly topography. Soils that are formed by glacial

action are called glacial soils. The soils of Fountain county are glacial soils. In the above mentioned ways and others, rocks are ever changing into finer and finer particles. This finely disintegrated rock material constitutes the mineral matter of soils.

From these minerals such plant food as phosphorus, iron, potassium, sulphur, calcium and others are derived.

The productivity of soils is determined by the rock of which it was formerly a part.

Shales weather into clay soils and are often cold and clammy and hard to work, but more productive than soils derived from sandstones. Limestone usually weathers into a very fertile soil provided the lime constituents have not been dissolved out. Soils derived from granite are usually rich in potash and as the supply decreases, due to cropping or leaching, there is a constant renewal as the small grains of feldspar dissolve. These potash-bearing grains may not dissolve rapidly enough to furnish sufficien potassium for maximum crop production and the yields decline. For this reason, that much potash is locked up in these mineral particles, chemical analysis of soils cannot be relied upon to determine the mineral plant food constituents. The chemical analysis, for example, may show sufficient potash, while this is present yet, it may not be in available form for plant use. It may be held tightly bound in these minute rock particles and not being released rapidly enough to supply the plant requirements. Then the chemical analysis may be misleading if this fact is not understood. The coarseness or fineness of the soil particles is the factor that determines the texture of the soil. In order of finest to coarsest, these soil particles are, clay, silt, sand, gravel, and stones.

Clays are soils that contain as much as 25 per cent of clay and usually contain much silt.

Clay loams contain from 15 to 25 per cent of clay, mixed with much silt and some sand.

Silt loams are soils that contain more than 50 per cent of silt and with less than 15 per cent of clay and some sand.

Loams contain 30 to 50 per cent of sand and mixed with much silt and some clay.

Sandy loams contain 50 to 75 per cent of sand.

Fine sandy loams contain 50 to 75 per cent of fine sand, much silt and a little clay.

Sandy soils contain more than 75 per cent of sand.

Gravelly loams contain 15 to 50 per cent of gravel, with much sand and some silt.

Gravels contain 50 per cent or more of gravel.

Stony loams contain a large number of stones, from an inch and over, in diameter.

In order that certain distinctions may be brought out by a soil map, certain names have been added to the soil types in order that the map will show whether a given type is bottom along streams, or a terrace soil, prairie or upland soil. If the map merely showed on a given area there was present a silt loam, it might be upland or prairie soil, in color it could be gray, brown or black.

Certain names have been applied to the first bottom series, terrace series, black prairie soils, upland soils, and others. These names are not fixed as yet but there is an effort to better systematize in the future surveys.

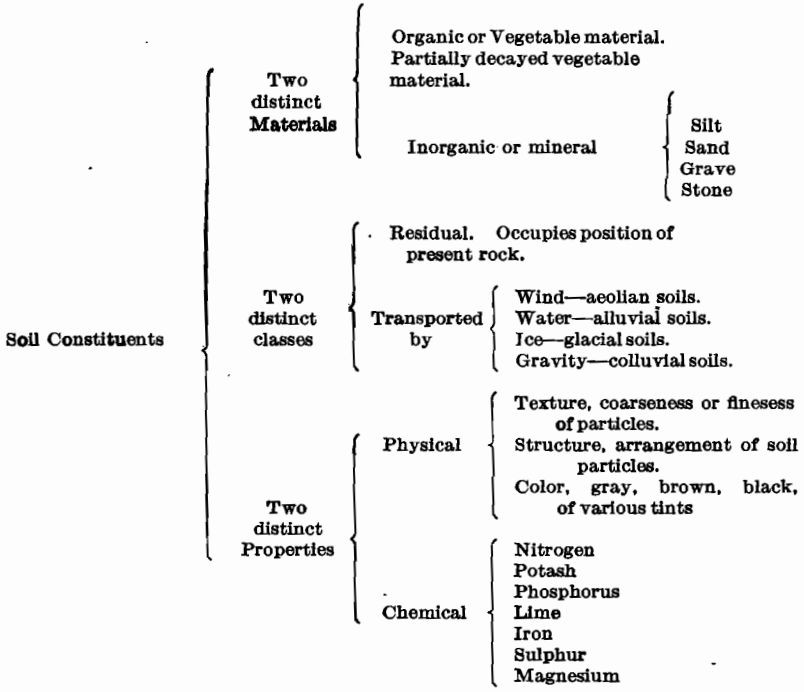
The Fox Series are terrace soils. The soils of the Genesee Series are confined to first bottoms along streams and is subject to seasonal overflow. The soils of the Clyde Series are dark colored, dark because of the great amount of organic mater present, and are chiefly prairie soils. The rich dark brown soils, associated with this series in north Fountain have been mapped as Carrington silt loam. The Carrington silt loam consists of a dark brown to black soil, associated with it are gravelly knolls or ridges crossing the area. The soils of the Miami series are distinguished from the Carrington series by their prevailing light-brown and gray surface soils and the mottled yellow and brown subsoil. Areas of Clyde silty clay loam are associated with the Miami series in the southern portion of the county.

The above examples show the meaning and necessity of using some method of classification as this.

Soils are made up of two distinct materials, namely, organic and inorganic or vegetable and mineral matter. Soils are divided into two classes, residual and transported. Residual soils are those soils that remain above the solid rock from which they were formed. Transported soils are those soils that have been carried from the place they occupied previous to weathering from bed rock.

Decayed rock, when sufficiently weathered, becomes soil. The parent rock largely determines the fertility of the soil.

The following outline is useful in the study of soil constituents:



The land in the southern portion of the county and the uplands bordering the Wabash river is suffering great losses due to erosive work of stream action. Much of the best portion of the soil is escaping rapidly. Each year gullies are lengthening into valleys, and the tillable areas are decreasing.

Shale deposits may be used up and coal beds disappear, but the soil must be saved. This land must be recovered from the hazardous grasp of erosion. Much more rapid erosion is allowed than necessary, if proper methods of prevention are applied.

It is high time that mankind awoke to the fact that without proper heed and careful, scientific methods of agricultural practices the soil is not indestructible, neither are the plant food elements inexhaustible. Lands subject to erosion along streams should be kept free from the scar of the plow.

The timber of such areas should not be cut too closely and the land used for grazing. Brush, straw or any coarse material thrown in the gully will hasten its disappearance by its own action.

The muddy rivers and streams are proof positive that the soil is being carried away.

The essential soil constituents are also being exhausted in another way. Products of the soil, directly and indirectly, supply the necessities and most of the luxuries of mankind. Plant life requires along, with other elements, potassium, phosphorus, and nitrogen. When a crop is removed from the soil a certain amount of these elements is removed. Little reasoning is required to show that if this process is kept up without the addition of any of these elements to the soil that its producing power will decrease if not finally fail.

*The following Table shows the approximate maximum amounts removable per acre annually of the three principal elements.

Produce.		Pounds		
Kind	Amount	Nitrogen	Phosphorus	Potassium
Corn, grain	100 bu	100	17	19
Corn, stover.....	3 Tons.	48	6	51
Corn crop.....	.....	148	23	71
Oats, grain.....	100 bu.	66	11	16
Oats straw.....	2½ tons	31	5	52
Oats crop.....	.....	97	16	68
Wheat, grain....	50 bu.	71	12	13
Wheat straw.....	2½ Tons	25	4	15
Wheat crop.....	.....	96	16	58
Clover hay.....	4 Tons	160	20	120

With the chief plant food elements disappearing at this rate what wonder that farms under poor scientific care are being abandoned. In a system of grain farming the loss to the soil is very great, but in a system of stock and grain farming combined, this loss is greatly diminished, though not altogether eliminated.

Scientific investigations show that at least 80 per cent of all fertilizing constituents present in the materials fed on the farm is voided by the animals in the solid or liquid excreta. Then the value of the manure produced from a ton of feeding material of the farm may be ascertained by taking 80 per cent of the fertilizing value of that material. With these facts at hand, the conclusion is, for the lands sake, feed the products of the soil on the farm.

*From G. C. Hopkins, Soil Fertility and Permanent Agriculture.

The Clyde Series of Soils.*

In color the soils of this series are brown, dark brown or black. The natural drainage is usually deficient and artificial drainage must be resorted to in order to bring them to the maximum of productiveness of which they are capable.

The swampy areas left by the retreating glacier supported a luxuriant growth of vegetation. The vegetable remains deposited annually by the plant growth has supplied the organic matter that gives to this soil series its potential power for abundant crop yields.

Clyde Silty Clay Loam.

The dark brown to black soils of Fountain county usually found in depressions, naturally poorly drained, locally called black ground, represents the Clyde silty clay loam of the county. The soil varies in depth from 9 to 15 inches, underlain by a dark brown silty clay loam which gradually changes into a dark blue clay or clay loam as depth increases. It is associated with the Miami series in southern Fountain and with the Carrington silt loam in the north-central portion. The Clyde silty clay loam requires careful handling, for if plowed too wet it is liable to become cloddy and its power to produce is materially lessened.

Corn is the chief product of this type and yields from 50 to 90 bushels per acre.

Fountain county has three distinctive prairie regions. Scotts Prairie, southwest of Hillsboro, contains some of the richest soil in the southern part of the county. Farms are well drained and well kept, beautiful homes and farm buildings indicate the prosperity and energy of the people.

Sharvnee Prairie, in the region of Newtown, represents a large area of soil of wonderful producing power.

Osborne Prairie lies between Covington and Stone Bluff, this region is no less productive than the other regions mentioned.

Smaller areas, but known for their richness, are found northeast of Kingman and northwest of Yeddo.

The portion of this type that occupies the depressed areas are heavier, containing more clay and have in some cases been classed as Clyde clay loam.

At the margins of some of these areas a fine sandy loam is found which may indicate the edge of a former lake.

---

*For a full description of this series see, Bul. No. 141 U. S. Dep. Agr.

The Miami Series.*

The surface soils of this group are light brown to ashy gray in color. The subsoil is yellowish-brown to mottled gray and brown. The topography varies from relatively flat in the flat phase to gently rolling and ridged. Along the larger stream courses and their tributaries rough and eroded surfaces are conspicuous. Much of this type requires drainage before best production is attained. In early times, trenches were dug and into these, poles and brush were piled and covered. Flat rocks were sometimes used in a similar manner. Later, sawed boards fastened together, not unlike the culverts of a short time ago.

These methods furnished temporary relief. At present drain tile are made of clay. The chief source of clays for drain tile in Fountain county is the Pleistocene formation. These drift clays are easily accessible, hence, little equipment is required for getting it to the mill and an excellent drain tile at a relative low cost to the farmer.

Although the more rolling portions of this type apparently do not need tile drainage as much as the relatively flat areas yet most soils respond favorably when such service is rendered.

The prime purpose of drainage is to lower the water table, this however, involves several other vital factors. Standing water shuts off the air from the roots of plants and they are drowned. The presence of water makes the soil cold and prevents early seeding, thus shortening the growing season.

Tile drainage removes the surplus water and brings in air. Ofttimes, after a heavy rainfall, bubbles may be seen escaping at the surface from earthworms runs, this is air being forced out from between the soil particles and being replaced by water. When the natural drainage is poor, and there are no tile drains, a large per cent of the water evaporates from the surface, there being no way for escape below. The lowering of the water table by surface evaporation is a slow process. But when the land is tile drained the surplus water passes down through the soil into the tile and fresh air comes in from above to replace the water. It is important that the soil be well aerated to supply oxygen to the roots of plants. Microscopic organisms of the soil require oxygen.

The bacteria that live on the roots of the legumes utilize the free nitrogen of the air, when the supply is shut off by a water

*For full discussion see, Bul. 142 Miami Series of Soils, U. S. Dep't. Agr.

filled soil, they cannot live. Tile drains enlarges the room for the development of root systems which is an important factor to vigorous plant growth. On rolling land, tile drains prevent washing and formation of gullies.

The Miami silt loam was formerly heavily forested. The more rolling areas produced the sugar maple in greatest abundance, while in the more nearly level areas beech was the predominating tree, but along with it were associated several species of oak, hickory, ash, walnut, elm and basswood. Along the stream courses the sycamore still is holding a footing in its favorite habitat.

Genesee Series of Soils.

The Genesee Series of Soils are confined to first bottoms along the larger streams. They are subject to seasonal overflow and the properties of a given area may change from season to season. This year a given area may be a sandy loam, next year, after the seasonal overflow, the area may be a silt loam or a gravelly loam. The Genesee soil is a transported soil. It is an alluvial soil, being brought to its present position by the agency of water.

While the type is well represented along the tributaries of the Wabash, by far the majority of this type is found along Wabash. Corn is the chief product of this type. Corn produces from 40 bushels to 75 bushels, with a probable average of 60 bushels. Occasionally a whole crop is lost, due to the irregular seasonal rainfall of the region. But even with a crop lost every few years there is still some advantages. They need not worry about commercial fertilizer or barn yard manure, for each overflow a top dressing of soil is deposited. While this may be true in the more protected places, yet out in the unprotected regions washouts often occur, ruining whole fields, or sand bars may be deposited, fertile fields changing them from productive and fertile fields in a few days time to little better than barren wastes.

Fox Series of Soils.

The soils of the Fox series are terrace soil, along the larger stream courses. They represent what was once the level of the channel. The stream, in wandering back and forth between the banks, cut the upland down. Then sinking to a deeper channel, has left this upper bottom and set to work cutting out again, perchance, in a different direction. Sometimes, on this side, then on that side of its course. A stream channel is ever changing.

At the extreme southwest corner of the county, probably in the near future, the Wabash river will cut across the bottoms, where it makes the sharp turn to the east and leave the wagon road as well as the railroad bridge across its deserted channel, necessitating the building of bridges at a point further west.

The terrace soils vary from a silt loam to a sandy and gravelly loams.

Climate of Fountain County.

Annual mean temperature	52 deg. F.
Average date of last killing frost	April 28.
Average date of last killing frost in autumn	Oct. 6.
Average annual precipitation	36 in.

Attica, with a population of 3,300, is the largest city in the county, and is located on the Wabash, in the northern part of the county.

Covington is the county seat of the county and is situated on a terrace of the Wabash.

Veedersburg, the hub city of the county, has a population of 1,750.